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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/815,562	03/23/2001	Reiko Kondo	0941.65367	7473

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EXAMINER

CAO, ALLEN T

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/815,562

Applicant(s)

KONDO, REIKO

Examiner

Allen T Cao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komuro et al (US. 6,587,318 B2) in view of Kawato et al (US. 6,327,123 B1).

Komuro et al (particularly figure 7) disclose a magnetic head having a magnetoresistive film 20 including a ferromagnetic free layer 3 at a top part thereof the ferromagnetic free layer changing a magnetization thereof to an external magnetic field (throughout the Komuro's specification, for example: column 4, lines 12-21 and 34-37; and column 6, lines 45-51); first and second magnetic domain control patterns (7, 7) provided on the side of the free layer 3, each of the first and second magnetic domain control patterns causing a pinning of magnetization in the free layer in the vicinity thereof (column 4, lines 34-37); a first electrode 9(5) provided on the free layer 3 in contact therewith at a region located between the first and second magnetic domain control patterns; and a second electrode 8 provided in electrical contact with a bottom surface of the MR film 20 as set forth in claims 1 and 5.

Regarding claim 5, Komuro et al also disclose a magnetic apparatus (figure 10) having a rotary magnetic disk 110 and a magnetic head 210 scanning over a surface of the magnetic disk 110.

Regarding claim 2, Komuro et al disclose a first insulation 6 (figure 7 and column 9, lines 12-16) covering the first magnetic domain pattern 7 and a second insulating film

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6 (the other side of the magnetic domain) covering the second magnetic domain control patterns, such that the first insulating film 6 is interposed between the first magnetic domain control pattern and the first electrode 9(5) and such that the second insulating film 6 is interposed between the second magnetic domain control pattern 7 and the first electrode 9(5) as claimed.

Regarding claim 3, Komuro et al inherently disclose that the first and second insulating films have a generally identical thickness.

Komuro et al only disclose that the magnetic domain control films 7 are formed on the free layer 3 (figure 12C) and then polished to the flat surface (figure 12D). Komuro et al do not clearly disclose that the magnetic domain control films are formed on the free layer as recited in claims 1 and 5.

Kawato et al disclose a magnetic head having a MR film including a free layer 21, domain magnetic control films 41 and electrodes (25a, 25b); wherein, the magnetic domain control layers are formed on the free layer 21 (figure 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MR head of Komuro et al such that the domain control layers are formed on the free layer as taught by Kawato et al.

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the MR head of Komuro et al such that the domain control layers are formed on the free layer as taught by Kawato et al to improve the magnetization between the free layer and magnetic domain control layers in order to improve read/write characteristics of the MR head.

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Regarding claims 4 and 6, Komuro et al disclose a magnetic apparatus (figure 10) having a rotary magnetic disk 110 and a magnetic head 210 scanning over a surface of the magnetic disk 110. Komuro et al (particularly figure 7) also disclose a magnetic head having a magnetoresistive film 20; first and second magnetic domain control patterns (7, 7) provided at both lateral sides of the MR film 20, each of the first and second magnetic domain control patterns causing a pinning of magnetization in the free layer in the vicinity thereof (column 4, lines 34-37); a pair electrodes (9(5) and 8) provided on the MR as set forth in claims 4 and 6.

Komuro et al do not disclose that 1) both of the electrodes are provided on the magnetic domain control regions and each electrode having a tip end part extending over the magneto resistive film toward the other electrode; 2) each tip end part extends beyond the domain control region, on which the electrode having the tip end part is provided, with a protruding distance of 0.25 μm or less.

Kawato et al disclose a magnetic head having a MR film including domain magnetic control films 41 and electrodes (25a, 25b); wherein, the electrodes are provided on the magnetic domain control layers (figure 7), and each electrode having a tip end part extending over the magneto resistive film toward the other electrode; each tip end part extends beyond the domain control region, on which the electrode having the tip end part is provided, with a protruding distance of 0.5 μm .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MR head of Komuro et al with that the electrodes are provided on the magnetic domain control layers (figure 7), and each electrode having a

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tip end part extending over the magneto resistive film toward the other electrode as taught by Kawato et al.

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the MR head of Komuro et al with that the electrodes are provided on the magnetic domain control layers (figure 7), and each electrode having a tip end part extending over the magneto resistive film toward the other electrode as taught by Kawato et al to improve the magnetization between the free layer and magnetic domain control layers in order to improve read/write characteristics of the MR head.

Kawato et al disclose that each tip end part of the electrodes extends beyond the domain control region, on which the electrode having the tip end part is provided, with a protruding distance of 0.5 μm . Kawato et al do not disclose that the protruding distance is of 0.25 μm or less.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the protruding distance of MR head of Komuro et al as modified by Kawato et al to be 0.25 μm or less instead of 0.5 μm .

The rationale is as follows: One of ordinary skill in the art would have been motivated to modify the protruding distance of MR head of Komuro et al as modified by Kawato et al to be 0.25 μm or less instead of 0.5 μm through resizing the distance of the protruding from 0.5 μm to 0.25 μm or less to improve the reproducing sensitivity of the head as taught by Kawato et al in column 8, lines 39-43).

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Response to Arguments

3. Applicant's arguments filed 7/19/04 have been fully considered but they are not persuasive.

In the Remarks, Applicant asserts that the combination of Komuro et al and Kawato et al is not a proper basis for rejection because:

“... there is no motivation to combine a tunnel magneto- resistive (TMR) sensor of a current perpendicular to the plane (CPP) type structure as taught by Komuro with an MR sensor of a CPI type (spin-valve sensor of an in-plane structure) as taught by Kawato”; and

“... It is an object of the present invention Thus ... there is no motivation for one skilled in the art to combine the teaching of Kawato and Komuro”.

The Examiner respectfully points out that Applicant argues the limitations which are not in the claims. Applicant does not claim for a “CPP” type MR head, nor that the effects as set forth in the Remarks, page 10, lines 5-12 (lines count without the figure). Applicant only claims for a “magnetic head” having a MR film, etc...

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both Kawato and Komuro claim for a “magnetic head” having a MR film.

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Komuro et al has been utilized for disclosing a "magnetic head" having all of the limitations of the claims except that Komuro et al do not clearly disclose that the magnetic domain control films are formed on the free layer as recited in the claims.

Kawato et al has been relied upon to disclose a "magnetic head" having a MR film including a free layer 21, domain magnetic control films 41 and electrodes (25a, 25b); wherein, the magnetic domain control layers are formed on the free layer 21 (figure 7).

Notes that both, Komuro et al and Kawato et al have been relied upon on, disclose a "magnetic head" structure as claimed.

Therefore, the Examiner maintain that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MR head of Komuro et al such that the domain control layers are formed on the free layer as taught by Kawato et al to improve the magnetization between the free layer and magnetic domain control layers in order to improve read/write characteristics of the MR head.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen T Cao whose telephone number is (703) 305-3796. The examiner can normally be reached on Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-7201.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.



Allen Cao
Primary Examiner

AC
December 23, 2004